

Virginia Department of  
Environmental Quality

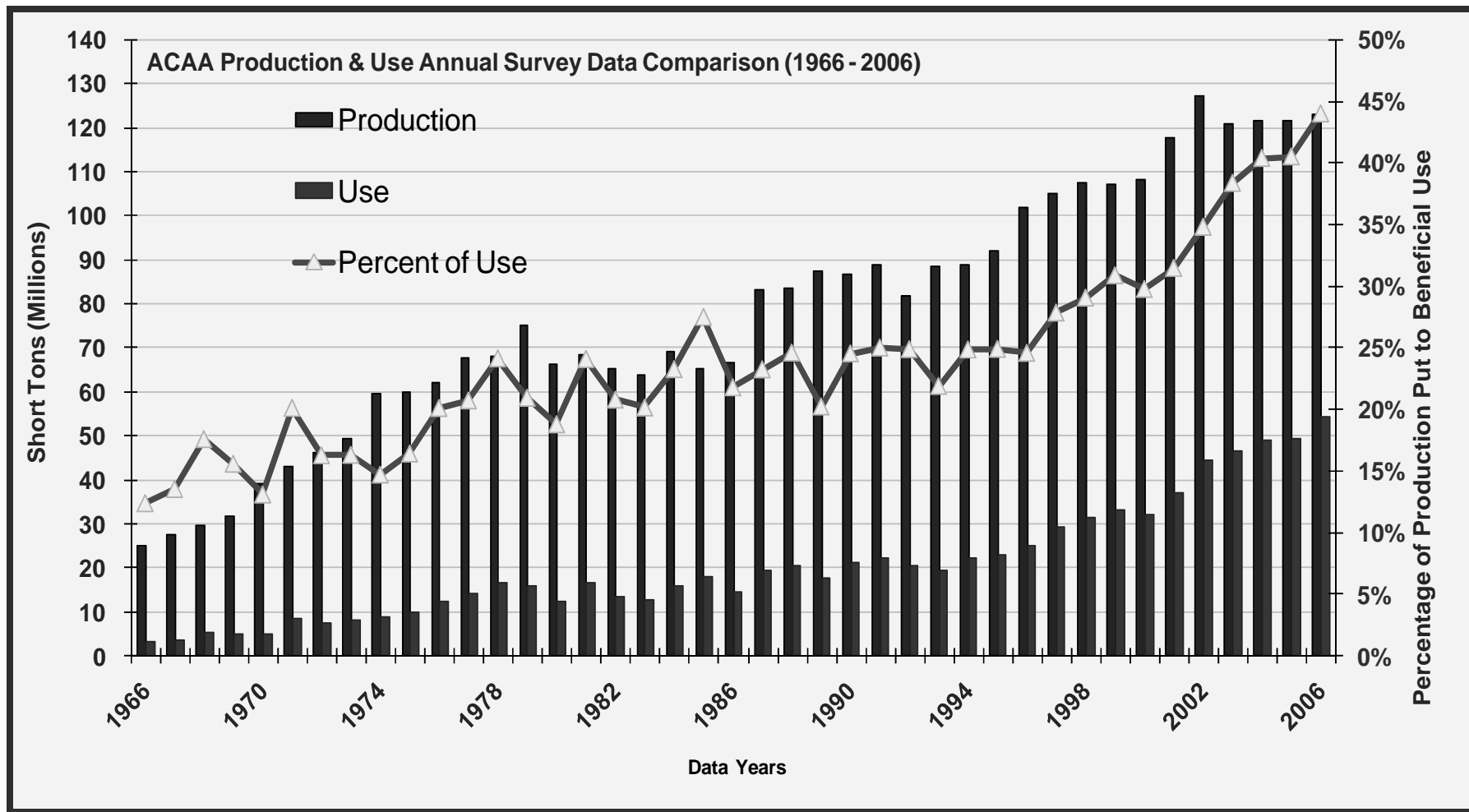
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# **Ash 101: Coal Ash Production & Use**

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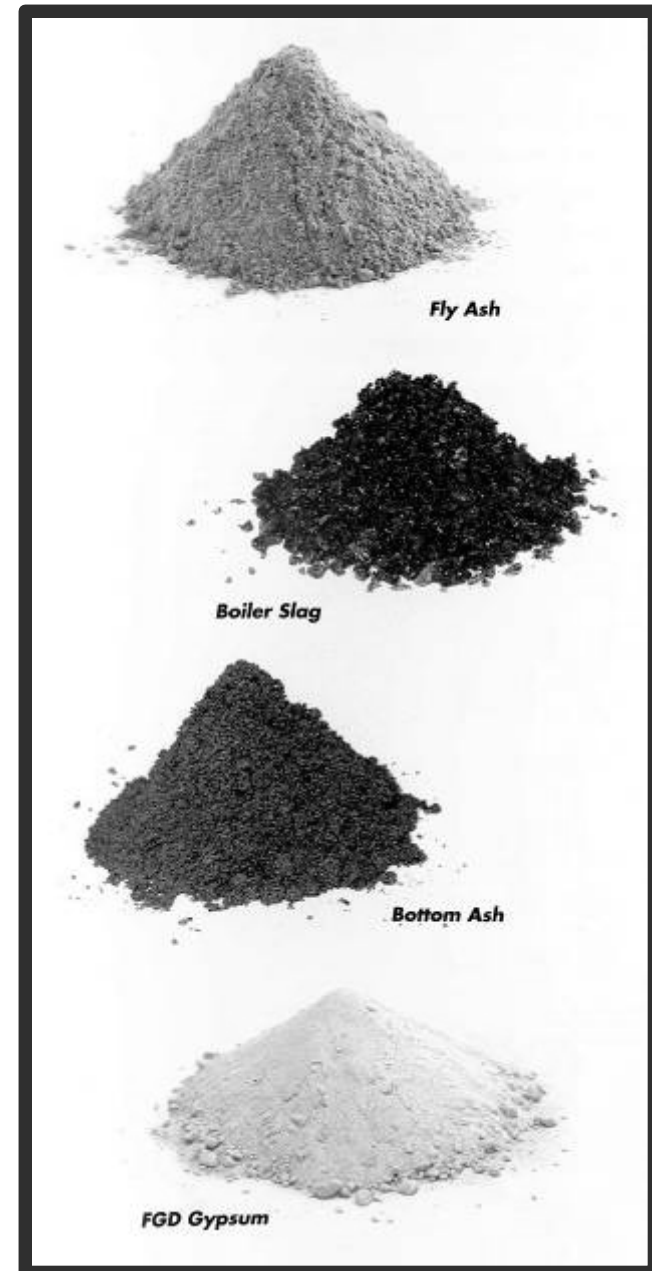


# Production and Utilization



# Coal Ash vs. CCPs

- Coal combustion products are the residuals from the combustion of coal and include:
  - Fly ash
  - Bottom ash and boiler slag
  - Air emission control system residues
- Although “Ash” and “CCPs” are terms often used interchangeably, CCPs is the more applicable terminology
- Numerous technical standards apply to CCP uses



# Beneficial Rules of Thumb

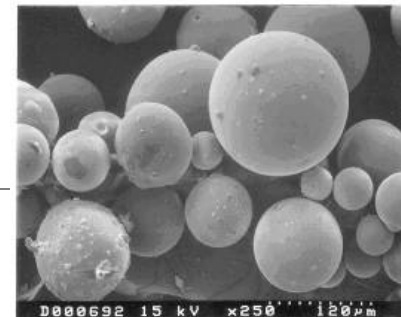
- For each ton of fly ash used instead of portland cement, approximately one ton of CO<sub>2</sub> can be avoided or postponed
- Fly ash is typically less expensive than portland cement
- CCPs can replace virgin, earthen or manufactured materials



# What Makes CCPs Useful?



- **Non-hazardous nature**
- **Mineralogical components allow them to be used in lieu of other natural materials**
- **Locally available**
- **Economically**
- **Can be conveyed in dry or in moistened form**



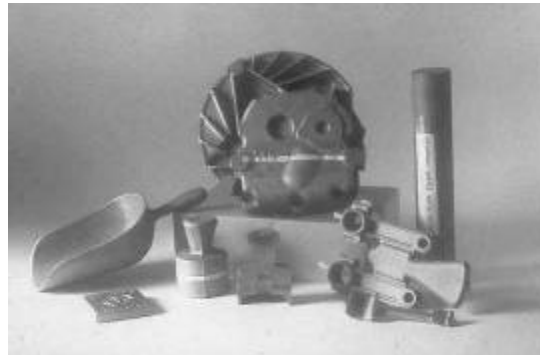
# Leading Use for Fly Ash

- Additive to concrete as a replacement for portland cement
  - Enhances durability
  - Reduces permeability
  - Improves workability
- When used in concrete it can reduce greenhouse gases, improve performance while conserving natural resources.



# Other Fly Ash Uses

- Cement production
- Masonry blocks and grouts
- Stabilization of soils
- Road base material
- Specialized applications such as metal castings, plastic fillers and in paints
- Structural fills and mine reclamation
- Waste stabilization and odor control



# Bottom Ash Uses



- Heavier than fly ash and granular in nature
- Used as raw feed for cement production
- Use in soil applications to improve drainage and blended with other materials for composting
- Used in masonry blocks, bricks and concrete products
- Can be used in road base and mineral fillers in asphalt and shingles
- A component of artificial aggregates



# FGD: Materials From Air Emission Control Systems

- Flue gas is scrubbed before leaving the stack to remove sulfur and nitrogen oxides
  - “Wet” processes such as flue gas desulphurization (FGD)
  - “Dry” process such as spray dryers
  - Other FGD technologies
- Other ways to scrub – selective and non-selective catalytic reduction (uses ammonia)



# FGD Gypsum Factors

- Provides high quality byproducts, such as synthetic gypsum, that is, in some ways, superior to natural mined gypsum
- Can be used in many agricultural settings
- Is often an ingredient in portland cement production



# FGD Gypsum – cont.

- Approximately 9.5 million tons (80%) of synthetic gypsum is recycled each year
- 30% of the wallboard produced annually uses synthetic gypsum exclusively



# CCP Industry Goals

- EPA, DOE and industry have set the goal of 50% utilization of all CCPs by the year 2011 as part of the Resource Conservation Challenge
  - 2006 utilization was approximately 43%
- Support the implementation of state beneficial use guidelines
- Provide technical information on characteristics, performance and potential uses whenever needed
- Participate in the development of technical standards

# Regulatory Issues

- Three decades of research and analysis support non-hazardous determination
- EPA Coal Combustion Products Partnership supports CCPs use – see (<http://www.epa.gov/epaoswer/osw/conserv/c2p2/index.htm>)
- Most states have beneficial use or regulatory guidelines for CCPs

# Conclusions

- **CCPs can be used in many ways and support sustainable construction**
- **They conserve natural resources and other materials, reduce the need for landfill space and help offset CO2 emissions**
- **When properly managed and engineered, CCPs do not have a negative impact on public health and the environment**

# Questions?

- **More information available from our website:** [www.ACAA-USA.org](http://www.ACAA-USA.org)
- **The C2P2 website:**  
<http://www.EPA.gov/epaoswer/osw/conserve/c2p2/>
- **DOE website:**  
<http://www.NETL.DOE.gov/>
- **Several FHWA related websites (RMRC; Turner-Fairbank, FHWA, etc.)**

# **THANK YOU**

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